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ECHO-IRLP *Nano-Node SE*

USER'S MANUAL

World's Smallest Plug & Play IRLP / EchoLink Embedded Solutions

SOFTWARE REVISION 1.026

Micro-Node International, Inc. - Henderson, Nevada

Table of Contents

1.0 WEB BROWSER ADMINISTRATOR CONSOLE 4

2.0 CONSOLE 5

Outputs, Last Reconnect, Connect Timer, EchoLink 6
Standard IRLP Functions 7
Send DTMF Commands & Regenerated Tones 7
Special Option Functions 8
Favorite Node Buttons 8
Special Function Buttons 9
Running/Start & Indicators 9
Flip Frame 10

3.0 MAP 11

GPS SAT TRACKING (Optional Feature) 12

4.0 SET CONSOLE 13

5.0 SET DECODE 14

6.0 SET ALLOW / DENY 15

7.0 SET MESSAGES 16

8.0 SET SCHEDULES 19

9.0 SET IRLP 22

10.0 SET ECHO 23

11.0 SETUP VPN CLIENT 25

Setup Up VPN Operation 25
Starting VPN 26
Stopping VPN 26

12.0 SYSTEM 27

Set Time Zone 27
Restarting IRLP 27
Enable SSH 27
Set Code Key 28

13.0 NODE MONITOR 29

14.0 LCD TOUCH SCREEN ADMINISTRATOR CONSOLE 30

IRLP MENU 31
Keypad Menu 32
Favorites Menu 33
Operator Menu 33
End Call 33

15.0 RADIO MENU 34

Select Radio Interface 34
Set Internal Radio Receive Frequency 35
Set Internal Radio Transmit Frequency 35
Set Internal Radio CTCSS Frequency 36

Set Internal Radio Squelch Level *36*
Set Internal Radio Channel Space *37*

16.0 AUDIO MENU 38

Send CWID Test *38*
Send Audio Calibration Test *38*

17.0 SYSTEM MENU 39

System Reboot *39*
System Restart *39*

18.0 SYSTEM NETWORK 41

19.0 FORWARDING IRLP PORTS THROUGH A ROUTER 45

20.0 EXTERNAL CONNECTIONS 46

1.0 WEB BROWSER ADMINISTRATOR CONSOLE

'ADMIN' is the Nano-Node custom web browser based package that is used to program and operate the Nano-Node. To access ADMIN point a JavaScript Enabled browser to the URL:

your-ip-address/admin

This will bring up the ADMIN Opening Screen. It displays the units assigned Callsign and IRLP Node Number. It also displays the units EchoLink Number if EchoIRLP has been activated on the unit.

The buttons in the left panel of the Admin screen are used to select the various Admin setup and control sections. The **Menu A** and **Menu B** buttons select the two available menu control banks.

IMPORTANT NOTE:
The ADMIN program can be Password Protected. This protection is setup through the System Screen. It is Strongly Recommended that Password Protection be used if the unit's HTTP Server Port is exposed to the Wide Area Network (Internet).

Note:
ADMIN can be brought up in a browser Pop-Up window with minimum space used for browser controls. To activate this Pop-Up window Double Click on the Picture Of The World on the opening screen.

2.0 CONSOLE

The Console Screen is the main monitor and control screen for the operation of the Nano-Node.

The Console Main Display Window shows the following information about the status of the Nano-Node.

The Top Line displays the nodes current state. If the node is connected it shows the connection type, IRLP or ECHO, and the connected node's Node Number and Callsign.

Last_In, **Last_Out** and **Last_CW** display the Last Call Received, Last Call Made and Last Call Waiting. The connection Time, or Date if greater than 24 hours, is also shown. If the Time shows a minus (-) it is the previous days time.

Interval displays the length of time the unit has been in its current state.

Options displays which Special Option Functions are currently Enabled.

ID Status displays the current state of the Automatic ID Program.

Codec and **Port** display the Codec and Port being used when connected to another node.

TimeOut displays whether the Connection Timer is Enabled or Disabled.

EchoLink displays whether EchoLink operation is Enabled or Disabled. This Item is only shown if the EchoIRLP Option is currently installed.

The lower Window in the display shows the command response information returned from the last command sent from the console.

The Indicators to the left of the main window show the states of the units various Inputs and Outputs.

The Buttons below the main display window are used to send commands and control various functions on the Nano-Node. A detailed description of these buttons and their functions plus other command control options follows.

Note:
In operation it should be noted that depending on the state of the node, various buttons and options are disabled. For example if the node were connected, any button or option that would attempt to make a connection would be disabled while the End Call button would be enabled.

Outputs, Last Reconnect, Connect Timer, EchoLink

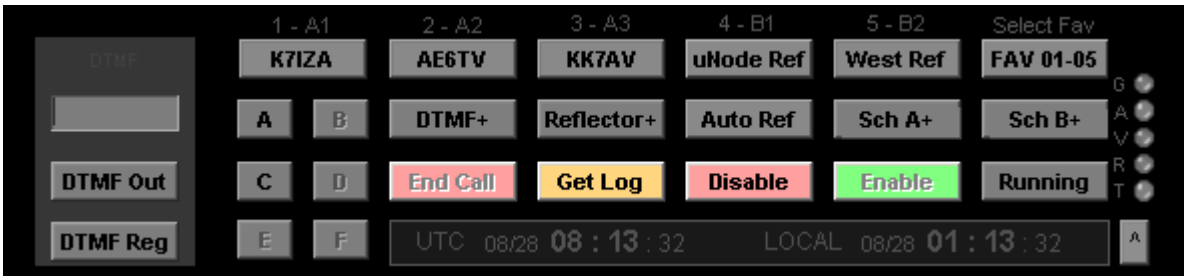
Operation of the Fan and Aux outputs of the unit can be controlled by moving the mouse cursor over the desired Indicator. At that time the indicator will show a 0 and 1 box. Click the 0 to force the Output Off or click the 1 to force the Output On.

To reconnect to any of the Last Connections, move the mouse cursor over the desired Last Connection caption. The caption will become highlighted. Click the highlighted caption to reconnect to that node. This only works if the unit is Idle.

To Disable or Enable the connection Time-Out Timer, move the mouse cursor over the Time-Out caption. The caption will become highlighted. Click the highlighted caption to toggle the Time-Out Timer operation.

If the node has EchoIRLP Installed then Echolink operation can be Enabled or Disabled by moving the mouse cursor over the EchoLink caption. The caption will become highlighted. Click the highlighted caption to Toggle the EchoLink Operation Mode. This only works if the unit is not connected to another node.

Standard IRLP Functions



Clicking the **Enable** Button will Enable IRLP operation.

Clicking the **Disable** Button will Disable IRLP operation.

Clicking the **Get_Log** Button will display the latest entries in the IRLP Log File in the display window.

Clicking the **End_Call** Button will Disconnect the current connection.

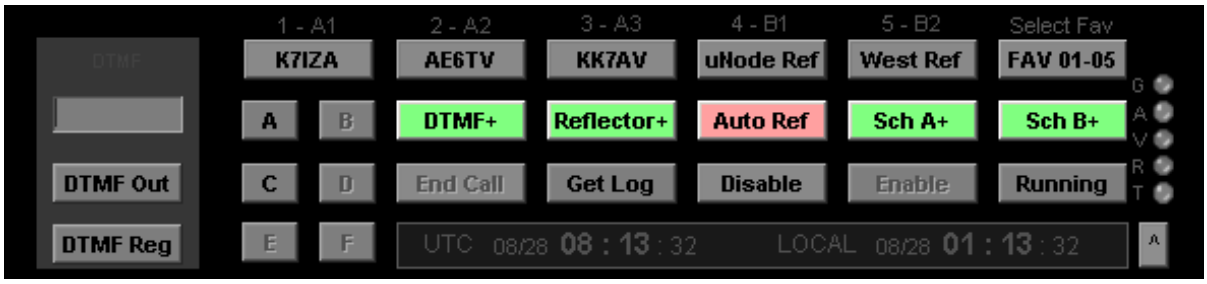
Send DTMF Commands & Regenerated Tones

To Send a DTMF Command, enter the DTMF Text Code in the Yellow DTMF Text Box above the DTMF Buttons. Valid characters are:
0 1 2 3 4 5 6 7 8 9 A B C D * # S P

To Send the DTMF Code as a Command to the Nano-Node unit Click the **DTMF_Out** Button.

To Regenerate the DTMF Code as Audio Tones out of the Nano-Node unit Click the **DTMF_Reg** Button.

Special Option Functions



The **DTMF** Button toggles the radio DTMF Control option. When it is Enabled (Green+) the unit will accept radio DTMF commands. When it is Disabled (Red) the unit will not accept radio DTMF commands.

The **Reflector** Button toggles the radio DTMF Reflector Access option. When it is Enabled (Green+) radio DTMF codes can be used to connect to a reflector. When it is Disabled (Red) radio DTMF codes cannot be used to connect to a reflector.

The **Auto_Ref** Button toggles the Automatic Reflector Reconnect option. When it is Enabled (Green+) the unit will automatically reconnect to the programmed reflector after the programmed interval of inactivity has occurred.

Notes:
Programming the various operation values for these options is accomplished using the Set IRLP Screen.

These functions can also be programmed in the Set Decode Screen to be controlled by DTMF Codes.

Favorite Node Buttons

The Nano-Node can have up to 30 Favorite Nodes programmed into it. The Favorite Nodes are arranged as six (6) banks of five (5) nodes each. Clicking a Favorite Button will connect the unit to that Favorite's Programmed Node.

These Favorites can also be called using DTMF Codes. To allow favorites to be accessed using DTMF, enter the DTMF Code to use in the DTMF Box of the Favorite in the Set Console Screen.

The label above each favorite button shows its currently selected number in Yellow. If a favorite has a DTMF Code assigned to it the label will also show the assigned DTMF code in Aqua. The far right **Select Fav** Button is used to step between the six Favorite Banks.

Special Function Buttons

The Nano-Node can have up to 6 Special Functions programmed into it. These functions can be either a DTMF Command to the Nano-Node or Regenerated DTMF Audio Tones for controlling a repeater linked to the Nano-Node.

Clicking a Special Function button will perform that buttons programmed function. Moving the mouse cursor over the button will bring up the Popup Caption Name for that function.

Note:
Both the Favorite Node & Special Function Buttons Captions and DTMF Codes are programmed using the Setup Console Screen.

Running/Start & Indicators

The **Running/Start** Button sets the Console mode to Run or Halt. When the console is in the Run mode its buttons are active and the display is continuously updated with real-time node information.

The **G** indicator lights Green when the GPS has satellite status is locked.

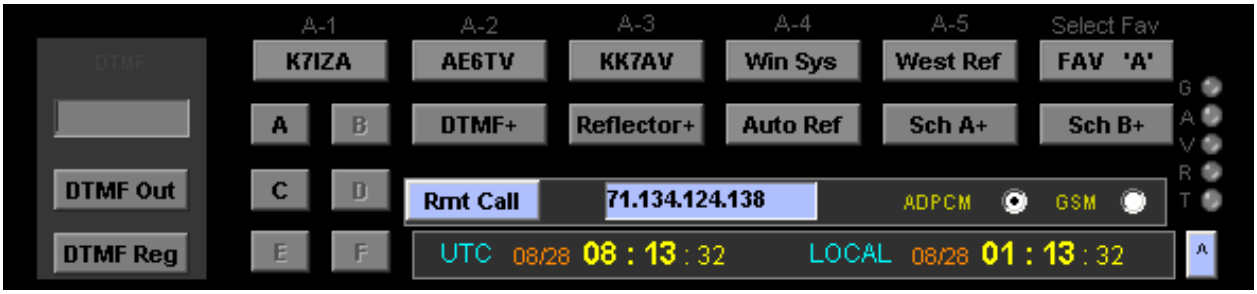
The **A** indicator lights Yellow during APRS reporting.

The [V] indicator lights Blue when the unit is using a VPN Connection.

The [R] indicator lights Green when the console is receiving a new update.

The [T] indicator lights Yellow when the console is Transmitting a Command.

Flip Frame



The bottom right section of the console contains a Flip Frame. This frame can be set to display several items. To change which Flip Frame is in view, click the [^] Button.

TIME CLOCK FRAME

The Time Clock Frame displays the current time in both UTC and the Local computer time. Clicking on 'LOCAL' in the time display can change the display format of the Local Time. This time is derived from the local computer's clock and not the Nano-Node.

REMOTE ADMIN FRAME

The Remote Admin Frame displays controls for Remote Admin operation. The Nano-Node IRLP system allows for a Remote Call to a Nano-Node. This allows a remote computer running the SpeakFreely program to communicate over the Nano-Node. It Does Not Allow A Connection with Any Other IRLP Node.

To make a Remote Call to your node enter the IP Address of the computer running the ADMIN program in the Blue Remote Call Text Box. This Must Be An IP Address and Not A DNS Name. Select the Codec Type to use, [**ADPCM**] or [**GSM**]. Click the [**Rmt_Call**] Button.

This will connect the computer running ADMIN to the Nano-Node. You can now use the SpeakFreely program to Talk and Listen over the node.

3.0 MAP

The Map Screen displays the Local location and the location of any connected node. The Local location is shown with a Red Marker. This location is taken from the Lat/Lon values programmed in Set Console.

When the unit is connected to another node, that node's location will be displayed with a Green Marker. The Distance and Bearing from the Local location to the connected node's location is also displayed in the area under the map.

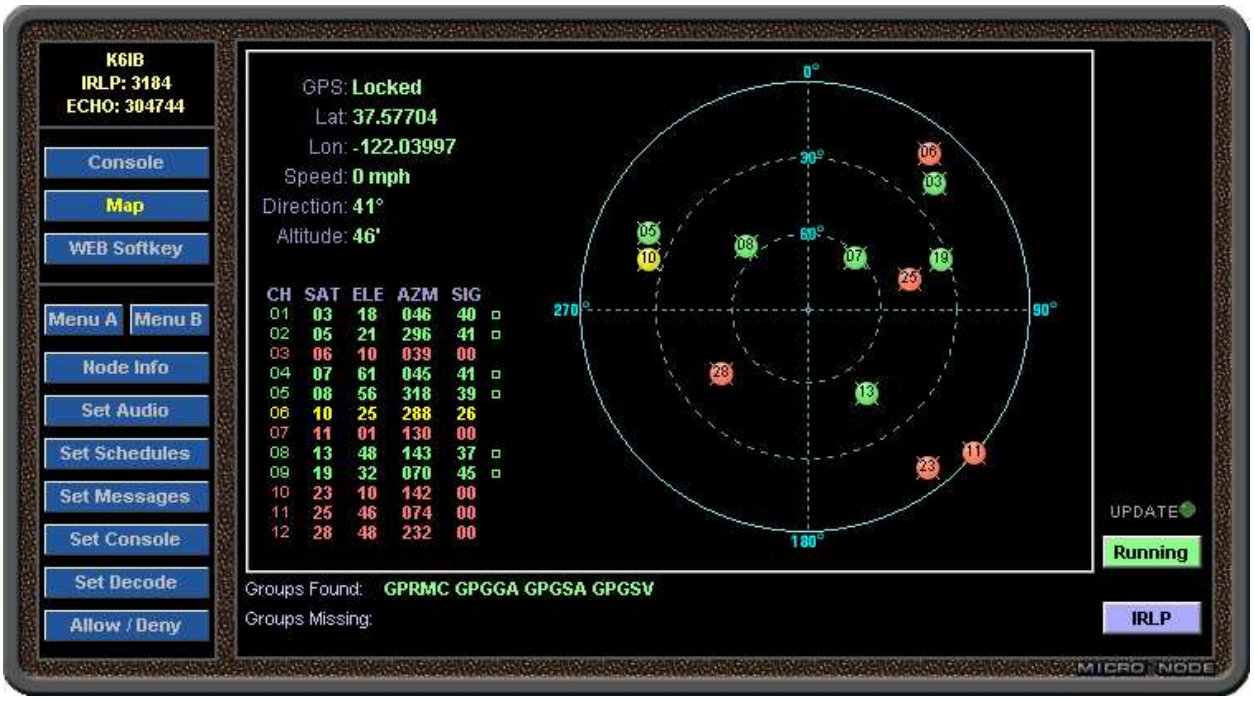
Clicking the Center buttons or clicking a map Node Balloon will center the map on the selected item. The Zoom Level can be changed using either the Zoom buttons or the Mouse Roller Wheel.

Moving the mouse over the map will show the Latitude and Longitude of the pointers location in a window at the upper left corner of the map.

Right Click the mouse and the map will change to Measure Mode (picture on right). As the pointer is moved the shortest distance from the click point to the current pointer location will be shown in a window at the upper right corner of the map.

Note:
The Map will only show locations of IRLP nodes that have provided Lat/Long information to IRLP.net. The Map Will Not Show Locations For EchoLink Connections.

GPS SAT TRACKING (Optional Feature)



The GPS Satellite Tracking Screen displays information and satellite tracking from a GPS receiver connected to the unit.

The GPS receiver status, location, speed, direction and altitude are shown in the upper left of the display. The information on each satellite in view is show in the lower left of the display.

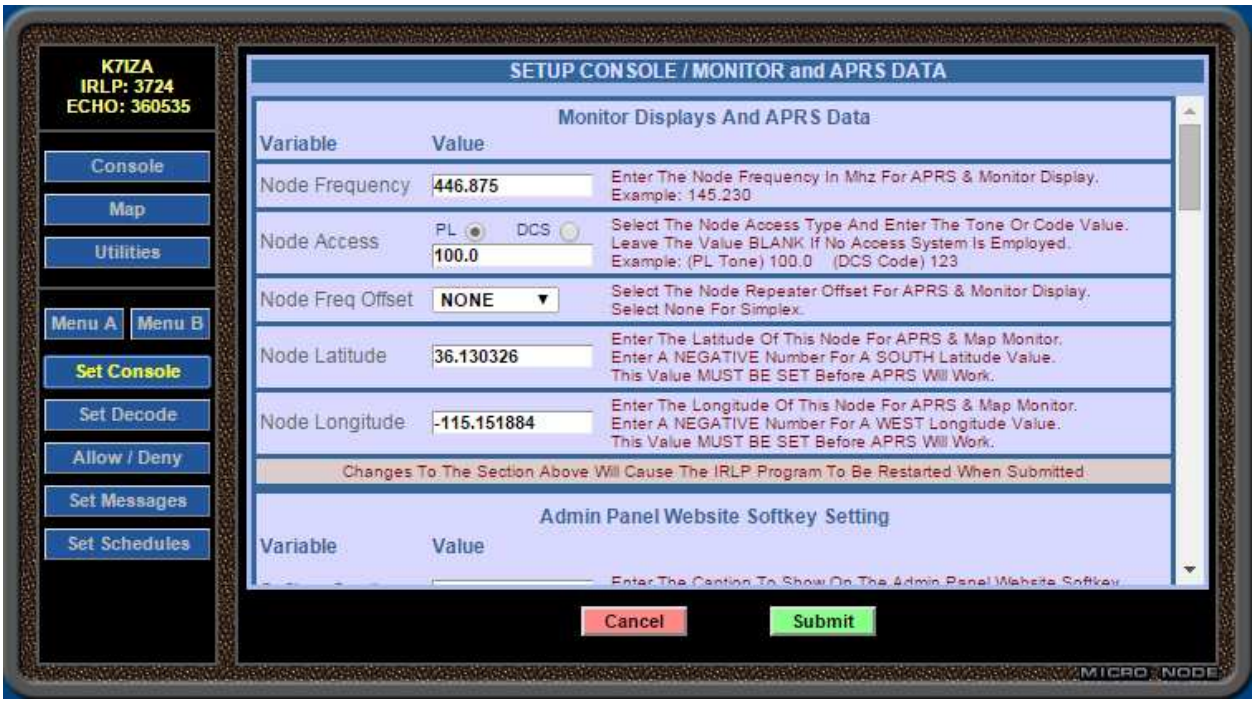
The right side of the display shows the overhead position of GPS satellites in view to the receiver. Satellites that are Locked are shown in Green.
Satellites with signals that are being received but are not Locked are shown in Yellow. Satellites with signals that are not being received are shown in Red.

The GPS sentence groups that are required by the display are shown in the area at the bottom of the display. If any groups are shown as missing the display will not be able to show all the GPS information.

Clicking the **IRLP** Button will return the display to the IRLP location map.

Note:
The GPS Screen requires a GPS receiver connected to the serial port and selecting that port as the GPS port using Set IRLP.

4.0 SET CONSOLE


K7IZA
IRLP: 3724
ECHO: 360535
Console
Map
Utilities
Menu A
Menu B
Set Console
Set Decode
Allow / Deny
Set Messages
Set Schedules
SETUP CONSOLE / MONITOR and APRS DATA
Monitor Displays And APRS Data
Variable
Value
Node Frequency
446.875
Enter The Node Frequency In Mhz For APRS & Monitor Display.
Example: 145.230
Node Access
PL
DCS
100.0
Select The Node Access Type And Enter The Tone Or Code Value.
Leave The Value BLANK If No Access System Is Employed.
Example: (PL Tone) 100.0 (DCS Code) 123
Node Freq Offset
NONE
Select The Node Repeater Offset For APRS & Monitor Display.
Select None For Simplex.
Node Latitude
36.130326
Enter The Latitude Of This Node For APRS & Map Monitor.
Enter A NEGATIVE Number For A SOUTH Latitude Value.
This Value MUST BE SET Before APRS Will Work.
Node Longitude
-115.151884
Enter The Longitude Of This Node For APRS & Map Monitor.
Enter A NEGATIVE Number For A WEST Longitude Value.
This Value MUST BE SET Before APRS Will Work.
Changes To The Section Above Will Cause The IRLP Program To Be Restarted When Submitted
Admin Panel Website Softkey Setting
Variable
Value
Cancel
Submit
MICRO NODE

The Set Console Screen is used to setup operation information for the Console, Maps and Monitor.

The first section sets the nodes Frequency, PL Tone or DCS Code, Offset, Latitude and Longitude. Maps and Monitors will use these values.

The second section will create a Web Softkey. Entering a caption for the Softkey and a web URL will create a SoftKey button on the ADMIN screen. When this button is clicked the browser will go to the programmed URL. One handy use for this button is to connect to the Micro-Node web site's USERS section that has various IRLP related programs. To use this feature enter the following for the Softkey URL:

`micro-node.com/users`

The Third section is used to setup Console Operation Values.

The Fourth section is used to setup the Favorite's node numbers, button captions and optional DTMF Code to use for the favorite.

The Fifth section is used to setup the Special Function commands and button popup captions.

When some of the values on this screen are changed the Nano-Node will need to restart the IRLP Program. This restart will occur automatically when the changes are submitted.

Note:
Be sure to click the Submit button after Making Changes

5.0 SET DECODE

The Decode Screen sets up the DTMF Codes to be used to execute over 30 Built-In Nano-Node functions.

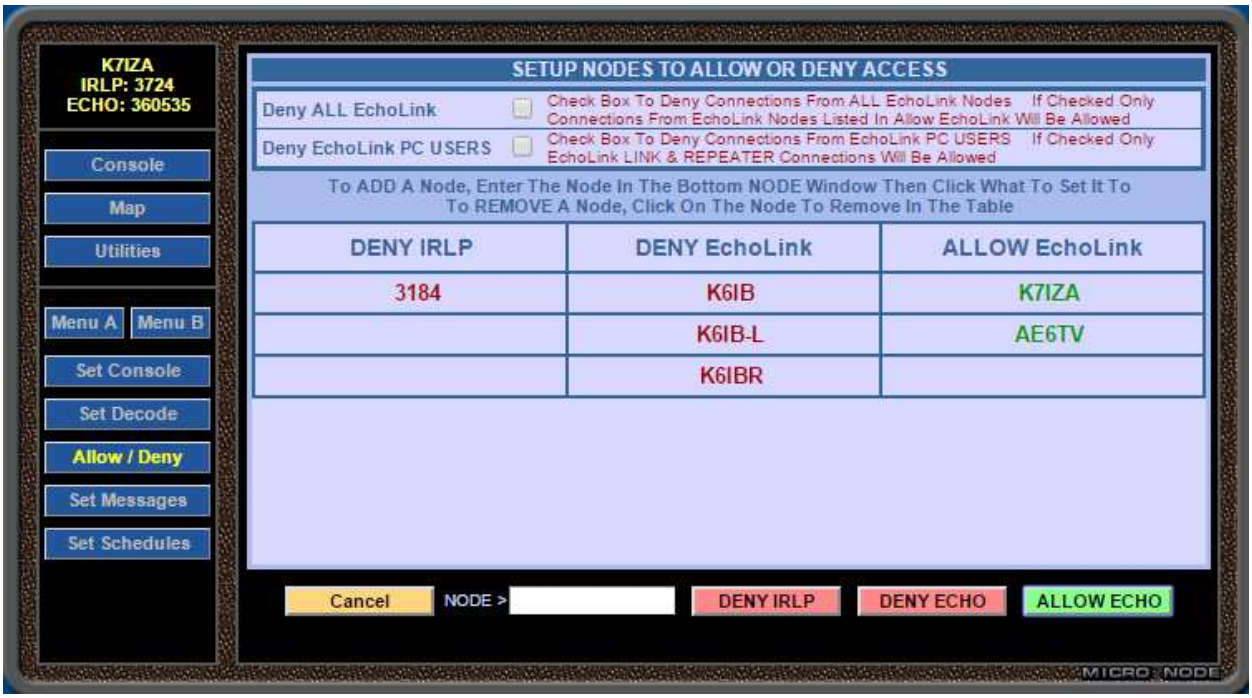
Each Function has a text box associated with it. To Activate a function simply enter the DTMF Code to use for that Function in its text box.

The DTMF Code Digits can be:
0 1 2 3 4 5 6 7 8 9 A B C D * #

Function Sections that show an asterisk (*) will require additional values to be set before that function will work. These values are set using the Set IRLP Screen.

Note:
Be sure to click the Submit button after Making Changes

6.0 SET ALLOW / DENY



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The Allow / Deny Screen is used to Allow or Deny specific IRLP and EchoLink nodes the ability to connect to the node.

To Deny All connections from EchoLink Nodes except those listed in the Allow EchoLink list, Check the **Deny ALL EchoLink** Check-Box.

To Deny All connections from EchoLink PC Users except those listed in the Allow EchoLink list, Check the **Deny EchoLink PC USERS** Check-Box.

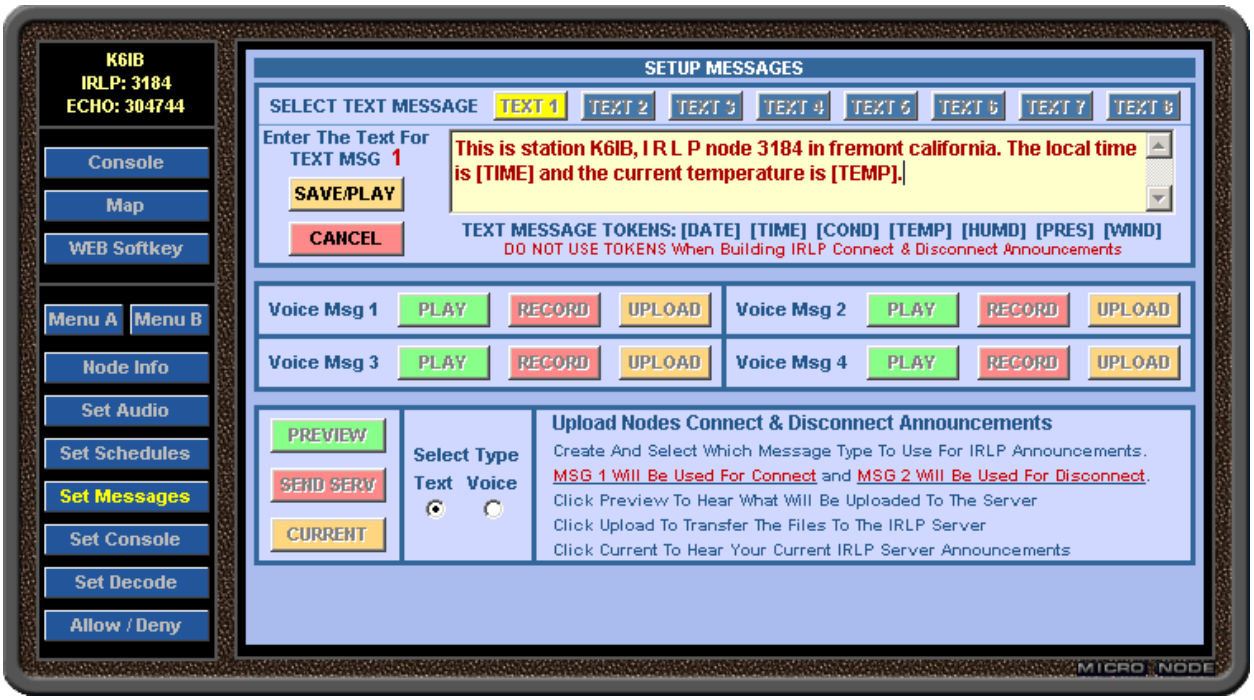
To Deny a specific IRLP node from connecting to the node, enter the IRLP Node Number of the node to Deny in the White **NODE** Text Box and click **DENY_IRLP**.

To Deny a specific EchoLink node from connecting to the node enter the EchoLink Callsign including the -L or -R for the node to Deny in the White **NODE** Text Box and click **DENY_ECHO**.

To Allow a specific EchoLink node to connect if the either the Deny All or Deny PC Users option is checked, enter the EchoLink Call sign Including the –L or -R of the node to Allow in the White **NODE** Text Box and click **ALLOW_ECHO**.

To Remove a Node, click on the Node Number or Callsign to be Removed from the list.

7.0 SET MESSAGES



The Set Messages screen is used to build the messages used on the Micro-Node and to upload custom IRLP connect & disconnect announcements to the IRLP server.

Note:
The Node Should Be Disconnect Before Performing Any Message Operations Since Some Of The Message Operations Will Not Start Or Perform Properly If The Node Is Connected.

The Nano-Node has a total of twelve (12) messages that can be played on the node either by using a DTMF code or the Auto Scheduler. There are eight (8) messages that are Text to Speech and four (4) Voice messages that are recorded wave files.

To hear a Text Message, select the message number and click the **PLAY** button.

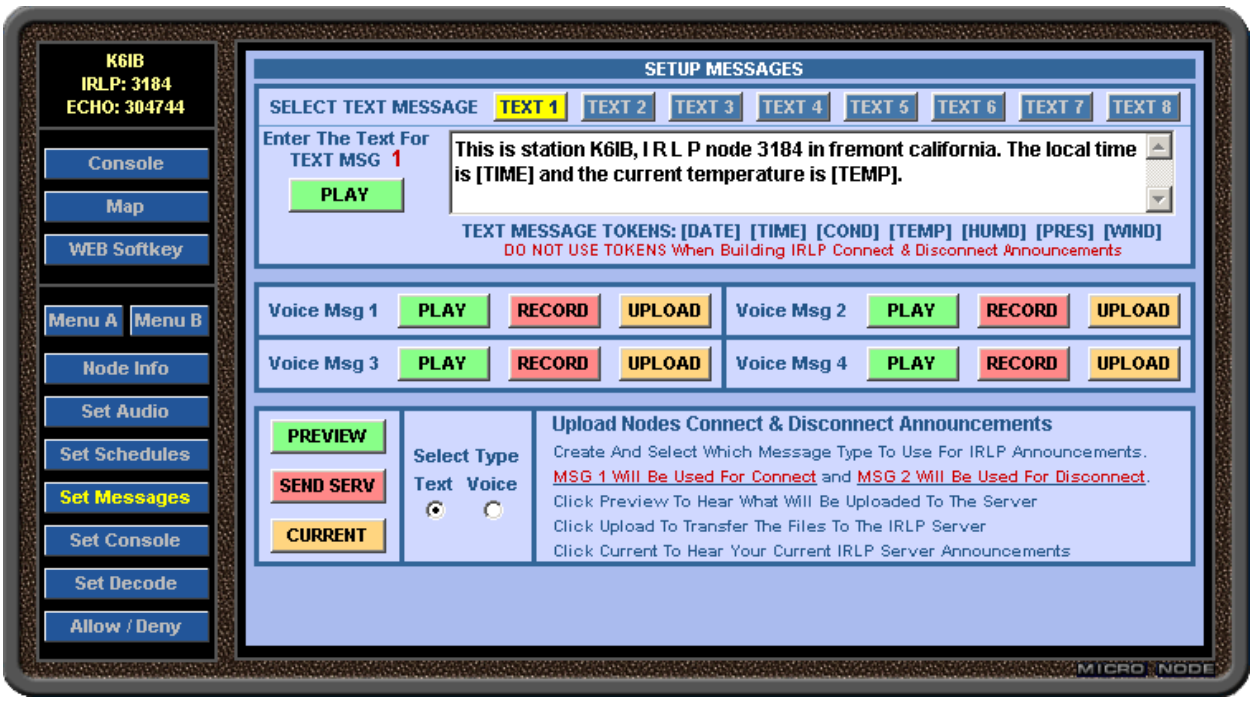
To enter a Text Message select the text message number to edit and type the text in the text window.

Tokens can be used to insert current information into the message. The Tokens available are listed on the message screen and are entered between brackets **[ ]**.
Example: entering **[time]** would cause the message to speak the current time at that point in the message.

Note:
Weather Tokens Only Work If a USA NOAA Airport Code Has Been Entered In The Set IRLP Section.

When you start to enter or change a Text Message, the text window's colors will be highlighted, the **PLAY** button will change to **SAVE/PLAY** and a **CANCEL** button will appear. This indicates that what is now displayed is not what is stored in the unit. To save

the text and hear the message, click the **SAVE/PLAY** button. To Cancel your changes, click the **CANCEL** button. If the **SAVE/PLAY** button is not clicked after changing a Text Message the changes will be lost.



To Playback a Voice Message click the **PLAY** button for the desired Voice Message.

To use a Radio to Record a Voice Message click the **RECORD** button for the desired message. The unit will respond with a recording introduction announcement followed by a tone. After the tone, key up your radio and record the message. To end the recording, unkey the radio. The unit will then play back the message just recorded.

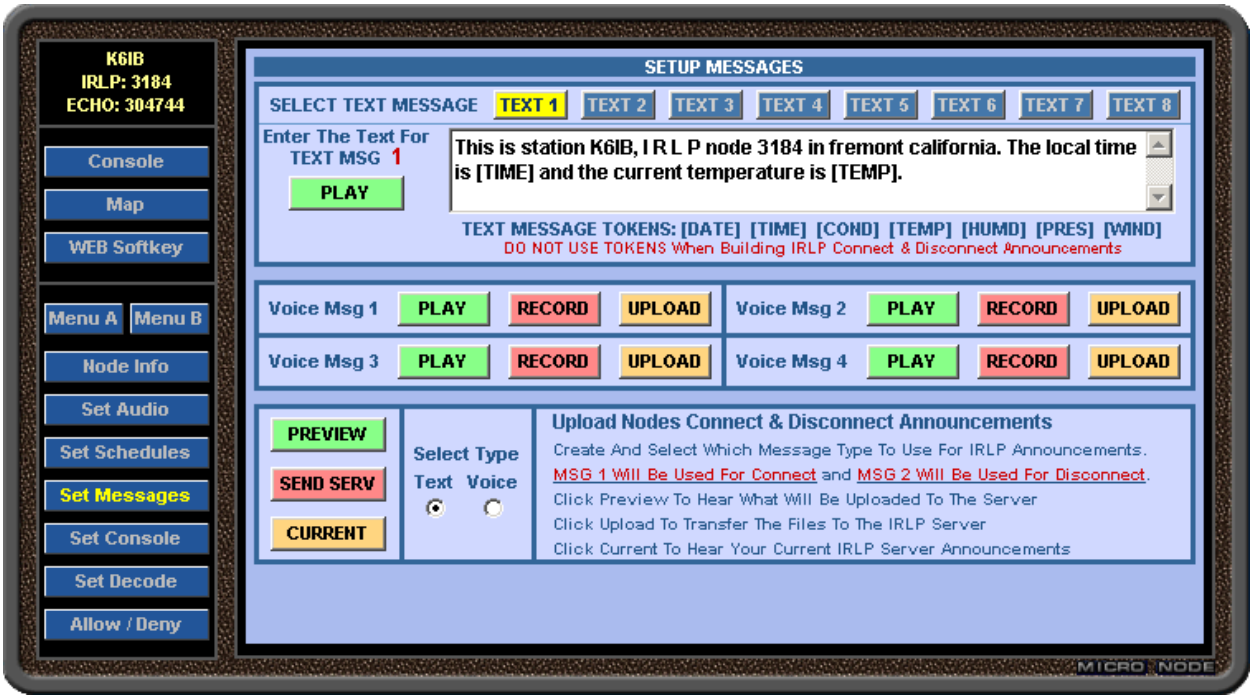
Note: The Node MUST NOT BE CONNECTED When Recording A Voice Message Using A Radio. If The Node Is Connected The Record Operation Will Not Be Able To Start

Voice Messages may also be created using wave (.wav) files. To upload a wave file to a Voice Message, click the **UPLOAD** button for the desired message. This will bring up a screen that will allow you to upload a wave file from your computer to the Nano-Node.

The uploaded file must be an uncompressed wave (.wav) file of 90 seconds or less in length and 10 Mbytes or less in size.

It a file upload reports that it was Unable To Convert Uploaded File Format then the wave file's format will need to be converted to Uncompressed PCM by other software before it can be uploaded.

Note: The IRLP System and the Nano-Node require a native wave file format of 8 Bit, 8kHz, Mono, PCM. If the uploaded wave file is not in this format the unit will attempt to convert it. The unit Can Not convert files that are in a compressed (MPEG) format due to licensing restrictions.



The IRLP system allows custom Connect & Disconnect announcements to be stored on their server and which are played on the Remote Node when your node connects and disconnects.

To create custom Connect & Disconnect announcements for your node decide if you want to use Text or Voice type messages for the announcements. Then using that type of message temporarily create the connect announcement as message number 1 and the disconnect announcement as message number 2.

Note: **You Must Use Messages Numbers ONE (1) For Connect and TWO (2) For Disconnect.** Do Not Use Any Text Message Tokens When Creating An IRLP announcement. They Will Not Work And Will Only Speak The Token.

Use the **SELECT_TYPE** selector to set the type of messages you created for the announcements and then click the **PREVIEW** button. This will play a preview of the selected announcements back to back with the connect announcement being first. You may continue to change the messages and preview until the announcements are what you want to send to the IRLP server.

When you have the announcements you want to use click the **SEND_SERV** button to send them to the IRLP server.

Note: Once The Announcements Have Been Sent It Will Take From **Several Hours To A Day** For The Announcements To Be Reviewed By IRLP And Updated On Their Server.
After Uploading The Messages, The Two Messages You Used For The Upload Are No Longer Needed And Can Be Change For Use As Normal Messages.

To hear the announcements currently active on the IRLP server for your node click the **CURRENT** button.

8.0 SET SCHEDULES

The Set Schedule screen is used to program scheduled events to be run at specific times. It allows the Nano-Node to perform up to 20 time-scheduled events.

To enter an event, click on the line in the lower window where the event is to be entered. The line will become highlighted and the upper window will show the event information for that line.

To Activate the line, in the ENABLE section select the Enable Status for the entry. When **Ena** is selected the event is Enabled. When **Dis** is selected the event is Disabled. When **Sch A** is selected the event will only be Active if the **SCH A** option is enabled. The **SCH A** option is controlled by the **SCH A** button on the console or by a programmed DTMF Command. When **Sch B** is selected the event will only be Active if the **SCH B** option is enabled. The **SCH B** option is controlled by the **SCH B** button on the console or by a programmed DTMF Command.

In the TYPE-TIME section select whether the event should occur at a **Fixed** Time or **Repeat** at a Time Interval. Then use the drop down boxes to select the Time or Repeat Interval for the event. Repeat Intervals are locked to standard clock interval times. For example if 15 min were selected the event would occur every hour at **:00, :15, :30, and :45.** If 4 Hrs were selected the event would occur on the hour at **00:00, 04:00, 08:00, 12:00, 16:00 and 20:00.**

In the DAYS OF WEEK section check the boxes for the days of the week that the event should occur.

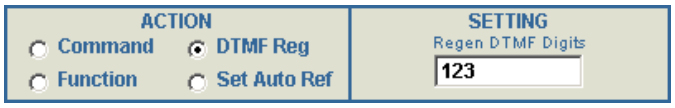
In the WHEN section select when the event is to occur. Selecting **Always** will always make the event occur. Selecting **If Con** will make the event occur only if the node is Connected at

the event time. Selecting **if Idle** will make the event occur only if the node is Idle or Disabled at the event time.

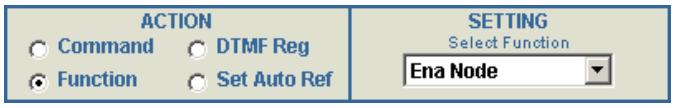
In the ACTION section select the type of action the event is to perform. Different SETTING sections will appear depending on the Action selected.

To set the event to send a DTMF Command, select **Command** and then enter the Command DTMF Digits in the SETTING text box

To set the event to send Regenerated DTMF Tones, select **DTMF Reg** and then enter the Regen DTMF Digits in the SETTING text box.



To set the event to perform a specific function, select **Function** and then select the Function to perform from the SETTINGS drop-down box.



To set the event to change which reflector that Auto-Reflector Reconnect will use, select **Set Auto Ref** and then enter the Reflector Number in the SETTING text box.

An event can be set to perform a Node Disconnect before it executes the event action. To do this, check the box in the DISCONNECT FIRST section.

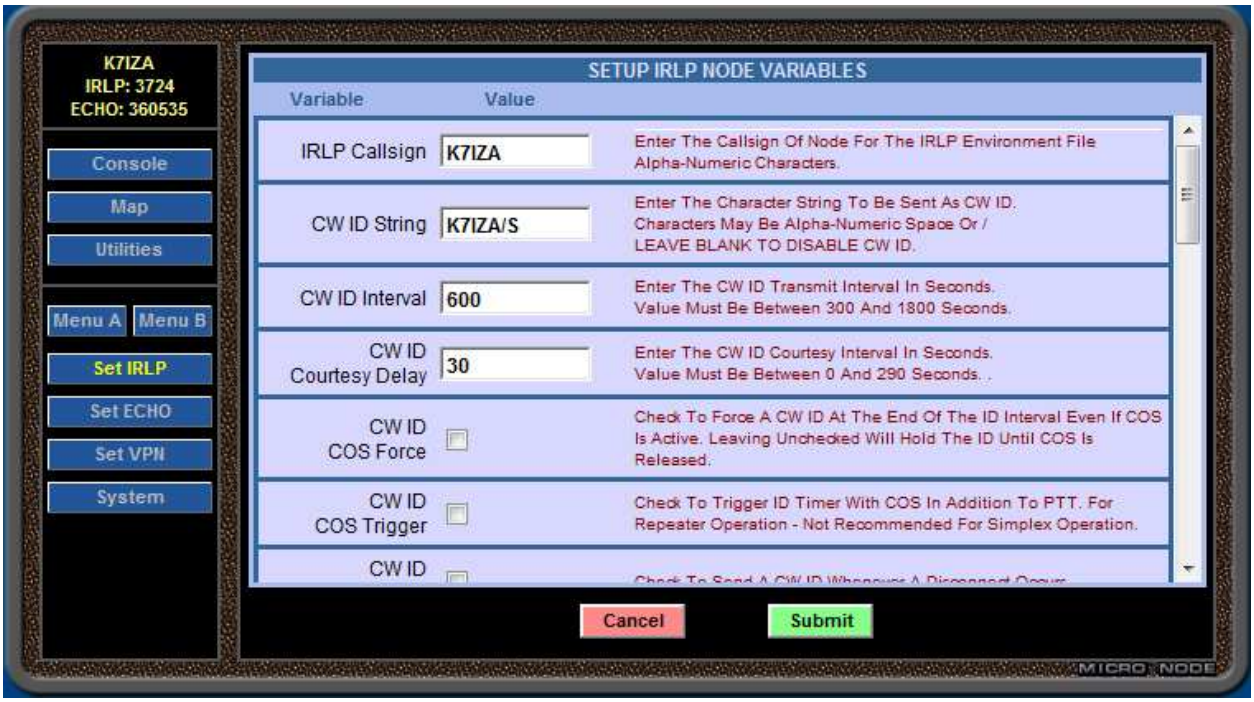
In the case where two or more events are scheduled to occur at the same time the events will occur in the order they appear in the list. To change the order of events in the list, select a line and then use the the **UP** or **DN** button to move that line up or down in the list.

To remove an event, select the event line and click the **DELETE** button.

Note:
If A Line Is Missing Event Information Needed To Make It Occur, Such As No Day Of Week Selected Or No DTMF Digits Entered, It Will Be Displayed In RED.

Note:
Multiple Changes Can Be Made To The Screen Before Submitting The Form But The Screen Schedule Changes Are Not Saved Until The Submit Button Is Clicked.
Be Sure To Click The Submit Button After Making Changes.

9.0 SET IRLP


K7IZA
IRLP: 3724
ECHO: 360535
Console
Map
Utilities
Menu A
Menu B
Set IRLP
Set ECHO
Set VPN
System
SETUP IRLP NODE VARIABLES
Variable
Value
IRLP Callsign
K7IZA
Enter The Callsign Of Node For The IRLP Environment File Alpha-Numeric Characters.
CW ID String
K7IZA/S
Enter The Character String To Be Sent As CW ID. Characters May Be Alpha-Numeric Space Or / LEAVE BLANK TO DISABLE CW ID.
CW ID Interval
600
Enter The CW ID Transmit Interval In Seconds. Value Must Be Between 300 And 1800 Seconds.
CW ID Courtesy Delay
30
Enter The CW ID Courtesy Interval In Seconds. Value Must Be Between 0 And 290 Seconds. .
CW ID COS Force
Check To Force A CW ID At The End Of The ID Interval Even If COS Is Active. Leaving Unchecked Will Hold The ID Until COS Is Released.
CW ID COS Trigger
Check To Trigger ID Timer With COS In Addition To PTT. For Repeater Operation - Not Recommended For Simplex Operation.
CW ID
Cancel
Submit
MICRO NODE

The Set IRLP Screen is used to setup IRLP Node Environment variables and other variables used by the Nano-Node.

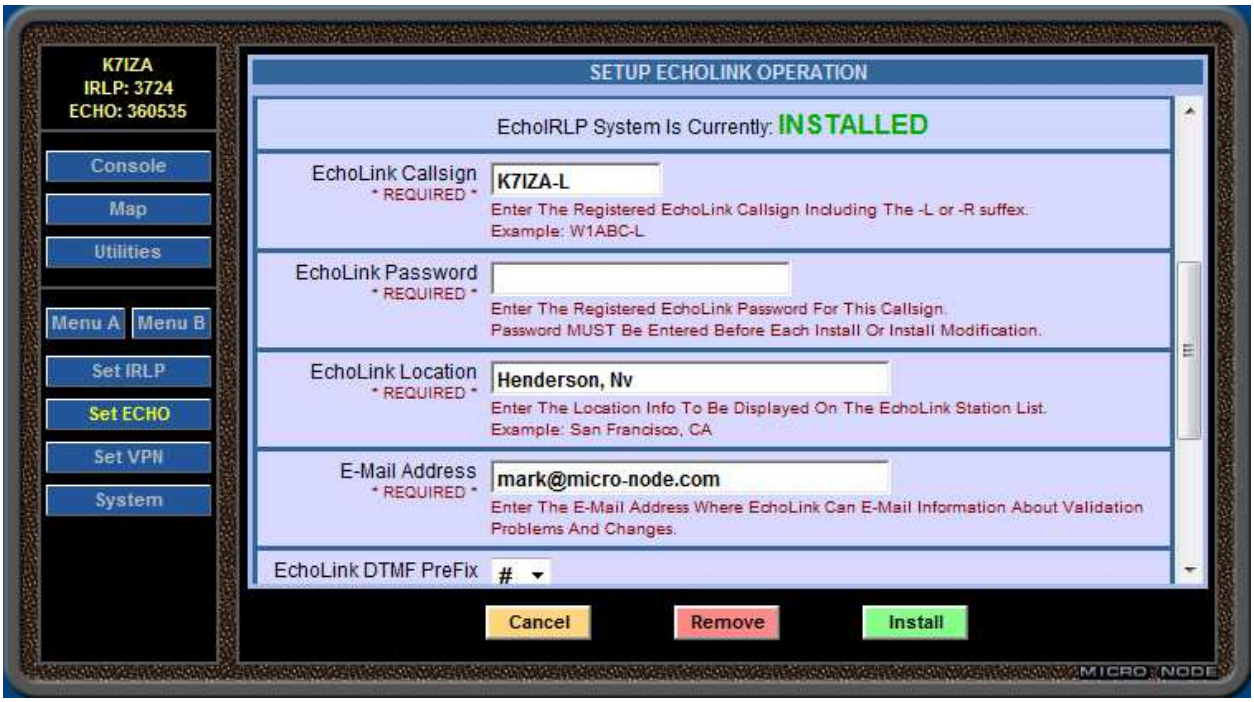
Included on this screen are all the sections necessary for setting the standard IRLP Node Environment variables.

There are a number of sections for setting variables for the Nano-Node Custom Functions. These functions include settings for Automatic ID, Fan Timer, Automatic Reflector Reconnect, Weather Reports (USA Only).

When some of the values on this screen are changed the Nano-Node will need to restart the IRLP Program. This restart will occur automatically when the changes are submitted.

Note:
Be sure to click the Submit button after Making Changes

10.0 SET ECHO



The Echo Screen is used to Install or Remove the EchoIRLP program. This program allows the Nano-Node to connect to EchoLink Nodes. Before you can install the EchoIRLP program the EchoLink Callsign to be used must be registered with EchoLink and a Password assigned for that callsign. Only EchoLink Callsigns registered as Link (-L) or Repeater (-R) may be used for EchoIRLP operation.

To Install EchoIRLP the following information Must Be Entered:

1) The Registered EchoLink Call including the -L or -R
2) The Password Assigned to that Callsign
3) The Location Of The Node (example: Fremont Ca.)
4) The E-Mail address where EchoLink can reach the node owner

The EchoLink Node Number is optional and is only used by the Nano-Node to display on various screens. The Connect Banner is also Optional.

Once the information has been entered click the **Install** Button. This will bring up a confirmation screen to verify the information. To install EchoIRLP with the information shown on the confirmation screen click the **Install** Button.

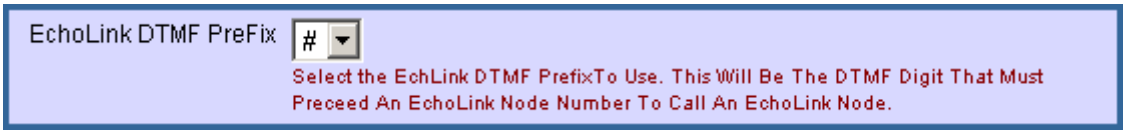
To change any of the settings on a currently installed EchoIRLP system, enter the new settings and repeat the Install process.

To Remove the EchoIRLP program click the **Remove** Button.

Note:
Installing or Removing EchoIRLP will cause a reboot of Linux

To allow system flexibility, the EchoIRLP operation can be setup to use one of five DTMF Prefix Codes. The Prefix Code is the DTMF digit that needs to proceed an EchoLink node number to indicate that it is a call to an EchoLink node.

This code is set using the **EchoLink DTMF Prefix** Dropdown box (shown below) when setting up an EchoIRLP installation.


EchoLink DTMF PreFix
#
Select the EchLink DTMF PrefixTo Use. This Will Be The DTMF Digit That Must Preceed An EchoLink Node Number To Call An EchoLink Node.

The DTMF Prefix can be set to one of the following:
 # * A B C

To Call an EchoLink node use the selected Prefix Code followed by the EchoLink Node Number.

Call EchoLink Node Examples:

To call EchoLink node 123456 with the Prefix Code set to '#' use:
#123456

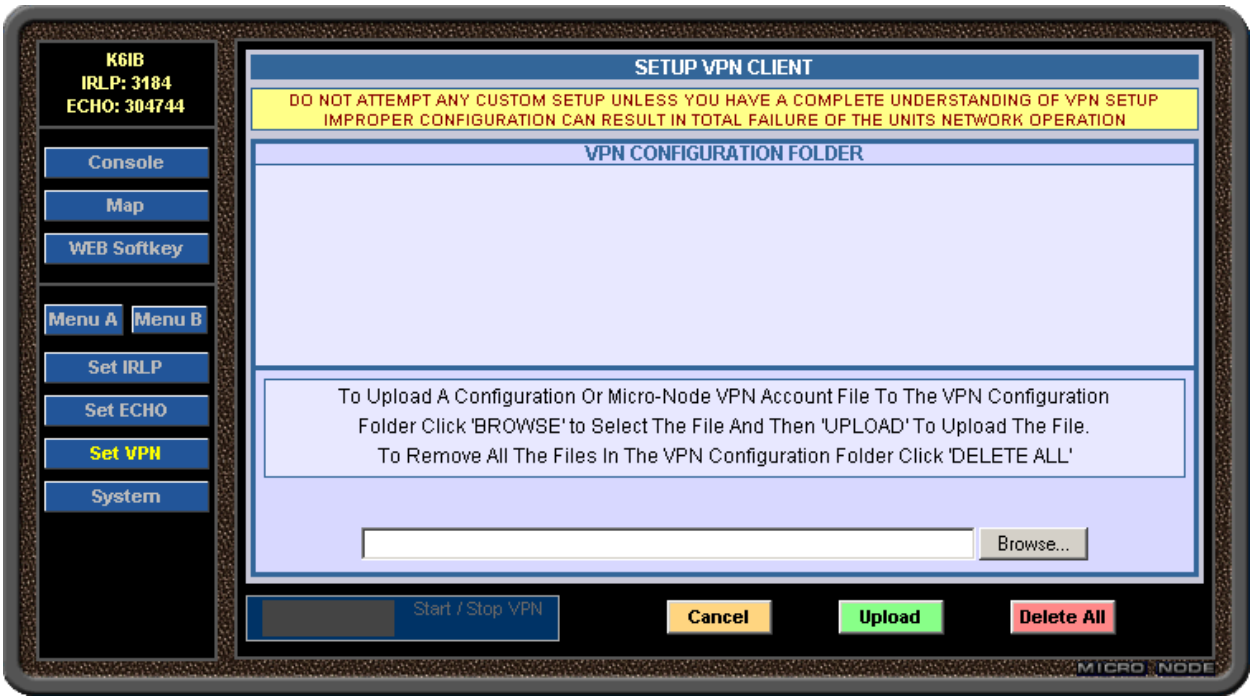
To Call EchoLink node 123456 with the Prefix Code set to 'B' use:
B123456

Notes:
To change the Prefix Code after EchoIRLP is already installed requires a reinstall of EchoIRLP with the new Prefix Code.

It is recommended that you use a Prefix Digit that is not used as the first digit of any other DTMF commands being used on the system. This will prevent other commands from conflicting with calls to EchoLink nodes.

After a Prefix Code is changed, any Favorite Code that is set up to call an EchoLink node will need to be changed to reflect the new Prefix Code.

11.0 SETUP VPN CLIENT


K6IB
IRLP: 3184
ECHO: 304744
Console
Map
WEB Softkey
Menu A
Menu B
Set IRLP
Set ECHO
Set VPN
System
SETUP VPN CLIENT
DO NOT ATTEMPT ANY CUSTOM SETUP UNLESS YOU HAVE A COMPLETE UNDERSTANDING OF VPN SETUP
IMPROPER CONFIGURATION CAN RESULT IN TOTAL FAILURE OF THE UNITS NETWORK OPERATION
VPN CONFIGURATION FOLDER
To Upload A Configuration Or Micro-Node VPN Account File To The VPN Configuration
Folder Click 'BROWSE' to Select The File And Then 'UPLOAD' To Upload The File.
To Remove All The Files In The VPN Configuration Folder Click 'DELETE ALL'
Browse...
Start / Stop VPN
Cancel
Upload
Delete All
MICRO NODE

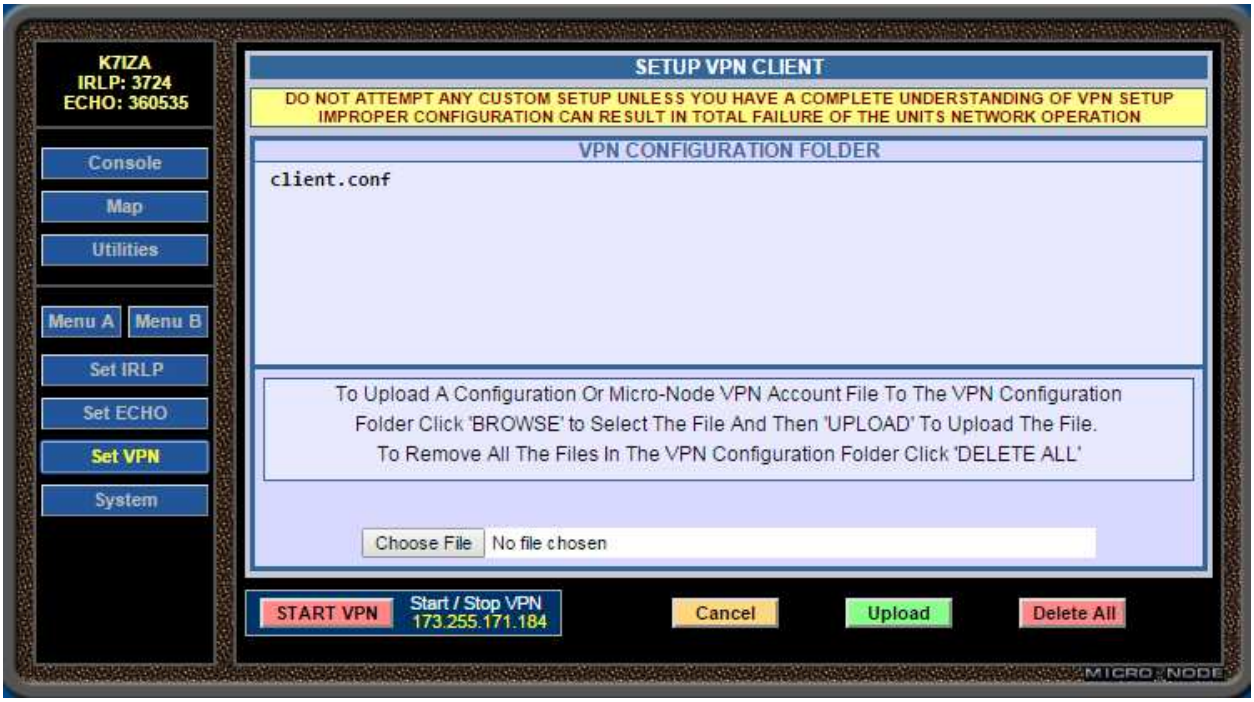
Setup Up VPN Operation

The Set VPN Screen is used to setup and operate the Nano-Node as a VPN client. VPN (Virtual Private Network) operation lets the Nano-Node use a VPN tunnel to connect to a dedicated VPN server over a connection that does not require any port forwarding for IRLP and EchoLink. This allows the Nano-Node to work while using Cellular Wi-Fi Hotspot connections that do not permit port forwarding.

The VPN Client is configured using information contained in the Open-Lite "client.conf" file located in the Nano-Node's VPN CONFIGURATION FOLDER. The "client.conf" file can be uploaded to this folder by selecting it using the **Browse** button and then clicking the **Upload** button to upload the selected file. The file in this folder can be deleted by clicking the **Delete All** button.

When you have successfully upload the required "client.conf" configuration file to the configuration folder a **START_VPN** button and VPN server IPA will be displayed on the setup screen (see next page).

Note:
VPN Operation Requires A Separate Dedicated VPN Server Setup With Port Forwarding And Configured To Match The VPN Client Configuration File Uploaded To The Nano-Node.
For more information about recommended VPN service providers please E-Mail: **support@micro-node.com**



Starting VPN

To Start VPN operation click the the **START _VPN** button on the Set VPN Screen. This will bring up a Warning box. To switch to VPN operation click OK in the Warning box. At this point an Establishing VPN Connection Screen will appear. Wait for the Connection Response Screen to be displayed which can take up to a minute. If the connection was established the Connection Response Screen will indicate **VPN UP**. The unit is now operating over the VPN Tunnel and its WAN IPA will be the VPN Servers IPA.

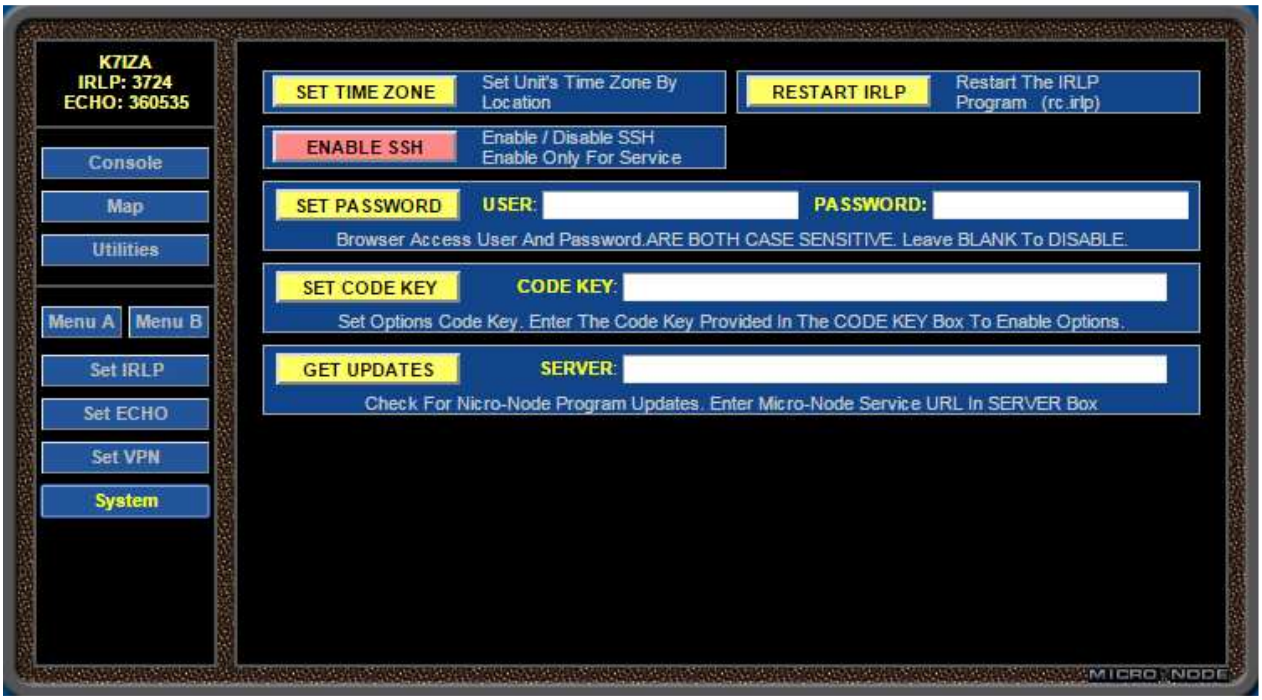
Stopping VPN

To Stop VPN operation click the the **STOP_VPN** button on the Set VPN Screen. This will bring up a Warning box. To switch to Normal operation click OK in the Warning box. At this point a Shutting Down VPN Connection Screen will appear. Wait for the Connection Response Screen to be displayed which can take up to a minute. If the connection was closed the Connection Response Screen will indicate **VPN DOWN**. The unit is now operating Normally and its WAN IPA will be your router's IPA.

Notes:
Starting and Stopping VPN Should ALWAYS Be Done With The Browser Using The Units LAN IPA. Otherwise the connected/shutdown status screens cannot be displayed since the WAN IPA will change during the operation.

The Up or Down state of VPN operation is retained over both Power Down and Linux Reboot operations. If VPN was active when the unit was shutdown it will start up using VPN.

12.0 SYSTEM



The System Screen is used to setup various Linux operations. Nano-Node System settings and to execute

Set Time Zone

To set the units Time Zone click the **SET_TIME_ZONE** Button. When the Time Zone screen appears select the Time Zone City from the dropdown text list and click **SET_ZONE**.

Restarting IRLP

To Restart the IRLP Program (rc.irlp) click the **RESTART_IRLP** Button. This will bring up a Wait Screen while the program restarts. Do Not Click Any Browser Buttons while the Wait Screen is being displayed. Wait until the Finished Screen is displayed Before Proceeding With Any Operation.

Enable SSH

To Enable or Disable the Linux SSH Server use the **DISABLE/ENABLE_SSH** Button. When the button is Green SSH is Enabled and clicking it will Disable SSH. When the button is Red SSH is Disabled and clicking it will Enable SSH.

Set Password

To setup or change the User and Password for Protected Access to the ADMIN program enter the new User and Password in the **USER** and **PASSWORD** Text-Boxes. Be aware that Both Of These Are Case Sensitive. After entering the User and Password click the **SET_PASSWORD** Button. This will bring up a Verify Screen. To set the new User and Password click the **SUBMIT** Button.

Note: To Disable Password Protection Leave The USER and PASSWORD Text-Boxes Blank And Click SET PASSWORD.

Set Code Key

To install a purchased option enter the Code Key provided by Micro-Node International in the **CODE KEY** Text-Box and click the **SET CODE KEY** Button.

Get Updates

To Get and Install New Software Updates enter the Micro-Node Update Service URL in the **SERVER** Text-Box. The current URL for this service can be found on the Micro-Node Website (micro-node.com). After entering the Server URL click the **GET_UPDATES** Button. The unit will connect to the server and display a Response Screen from the server. Follow the instructions on this screen to continue the Update Process.

13.0 NODE MONITOR

The Nano-Node Monitor Screen is a display that shows the real-time status of the unit. It is a Monitor Only and has No Control Capability.

Since the monitor has no capability to control anything on the unit it is not behind the ADMIN password protection system. This allows the Monitor to be viewed by anyone while still providing protection to the ADMIN package. It can be easily added to any websites by inserting it as an IFrame in an HTML document on that server.

To access the Monitor Screen point a JavaScript Enabled browser to the URL:
your-ip-address

14.0 LCD TOUCH SCREEN ADMINISTRATOR CONSOLE

'LCD-ADMIN' is Nano-Node's exclusive built-In LCD touch screen based menu package used for Monitoring, Controlling and Configuring the Nano-Node.

The opening screen displays the units assigned Call Sign and IRLP Node Number. It also displays the units EchoLink Number if EchoIRLP has been activated on the unit.

The four buttons located along the bottom of the screen, 'IRLP', 'RADIO', 'AUDIO' and 'SYSTEM' are used to select the various setup and control screens.

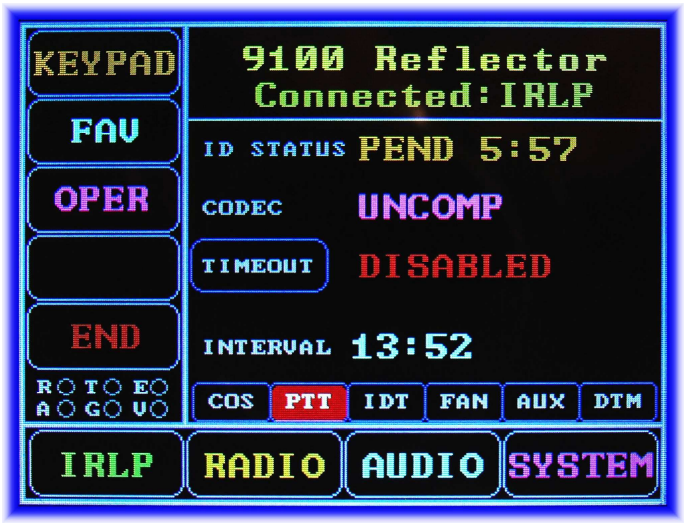
IRLP MENU

The IRLP SCREEN is the main monitor and control screen for the operation of the Nano-Node.

The IRLP Screen's Main Window shows the following information about the status of the Nano-Node. The Top Line displays the nodes current state. If the node is connected it shows the connection type, IRLP or ECHO, and the connected node's Node Number and Call Sign.

Last_In, **Last_Out** and **Last_CW** display the Last Call Received, Last Call Made and Last Call Waiting.

To reconnect to any of the Last Connections, touch the yellow node number within that caption button. This only works if the unit is Idle.



ID Status Displays the current state of the Automatic ID Program.

Codec Displays the Codec used when connected to another node.

TimeOut Displays whether the Connection Timer is Enabled or Disabled. To Disable or Enable the connection Time-Out Timer, touch the blue timeout button to toggle the Time-Out Timer operation.

Interval Displays the length of time the unit has been in its current state.

The Indicators along the bottom of the main window show the state of the nodes various Inputs and Outputs.

COS Indicates a valid radio signal is being received.

PTT Indicates the transmitter is keyed.

IDT Indicates the Automatic ID is transmitting.

FAN Indicates the FAN signal on pin 4 of the DB9 ext. radio connector is active.

AUX Indicates the AUX signal on pin 5 of the DB9 ext. radio connector is active. .

DTM Indicates a valid DTMF tone has been received.

The Buttons to the left of the main window are used to send commands and control various functions on the Nano-Node. A detailed description of these buttons and their functions plus other command control options follows.

Keypad Menu

Touch to open the DTMF keypad , enter the 4 or 5 digit IRLP/ECHOLINK node number you would like connected then touch the **SND** button. Touch the **RGN** button if you want the entered digits to be sent over the air for controlling radios on the other end of the connection.

Favorites Menu

FAV Touch to open the FAVORITES keypad, The Nano-Node can have up to 30 Favorite Nodes programmed into it. The Favorite Nodes are arranged as six (6) banks of five (5) nodes each. Clicking a Favorite Button will connect the unit to that Favorite's Programmed Node. The **FAV 1-5** Button is used to step between the six Favorite Banks.

Operator Menu

OPER Touch to open the OPERATOR keypad, IRLP and ECHOLINK system operation can be enabled or disabled by touching and toggling their individual buttons. This only works if the unit is not connected to another node. Operation of the Fan and Aux outputs located on the ext. radio DB9 connector can be controlled by touching and toggling their individual buttons.

End Call

END Touch to Disconnect the current connection.

15.0 RADIO MENU

The RADIO Screen is used for configuring the internal 430-450Mhz radio parameters and selecting whether the node will use the internal or external radio for node operation. A detailed description of these parameters and their functions plus other command control options follows.

Select Radio Interface

Touch to open the SELECT RADIO dialog box. Select the **INTERNAL** button to configure the node to use the internal radio. select the **EXTERNAL** button to configure the node to use the external radio/repeater wired to the DB9 external radio connector.

Set Internal Radio Receive Frequency

Touch to open the radio RECEIVE FREQENCY dialog box. Enter the desired receive frequency between 430-450Mhz then touch **ENT** to save the new value or **CAN** to abort. A decimal point is required after the megahertz portion of the frequency.

Set Internal Radio Transmit Frequency

Touch to open the radio TRANSMIT FRQUENCY dialog box. Enter the desired transmit frequency between 430-450Mhz. then touch the **ENT** to save the new value or **CAN** to abort. A decimal point is required after the megahertz portion of the frequency.

Set Internal Radio CTCSS Frequency

Touch to open the CTCSS FREQUENCY dialog box. Use the up/down buttons to select the desired frequency and then touch the **ENTER** button.

Set Internal Radio Squelch Level

Touch to open the SQUELCH LEVEL dialog box. Use the up/down buttons to select the desired squelch level and then touch the **ENTER** button.

Set Internal Radio Channel Space

Touch to open the SELECT CH SPACE dialog box. Select the **12.5Khz** OR **25.0Khz** button to configure the internal radio for the proper channel space filtering.

16.0 AUDIO MENU

The Audio Screen is used to adjust the various Nano-Node audio settings and activate several audio system test operations.

The **XMIT** Slider adjust the transmit output audio level to the connected radio.

The **RECV** Slider adjust the receive input audio level from the connected radio.

The **ID L** Slider adjust the transmit output audio level of the CW Identification Tones.

The **ID P** Slider adjust the frequency of the CW Identification Tones. The frequency can be set to a value between 400 and 2900 Hz.

Send CWID Test

Touch for an instant CW Identification over air using the current Level and Pitch settings. Levels and pitch cannot be adjusted during this action.

Send Audio Calibration Test

Touch to transmit over the air a 10 second 1 kHz tone at a level of –6 dB (50% Modulation). Levels may be adjusted during this action.

Touch to transmit over the air a 10 second Tone Sweep at a level of –6 dB (50% Modulation). The sweep frequency starts at 100 Hz and sweeps to 5.1 kHz at a linear rate of 500 Hz per second. During the sweep each LED above the button represents a 500 Hz Increment. Levels may be adjusted during this action.

17.0 SYSTEM MENU

The System Screen's Main Window contains buttons for rebooting, shutting down the node's operating system or restarting the IRLP system software. There are also buttons for setting LCD display attributes DIM Display and LOCK Display timers.

System Reboot

Touch to reboot the operating system. This will bring up a Verify Screen, touch OK to execute the reset or CANCEL to abort.

System Restart

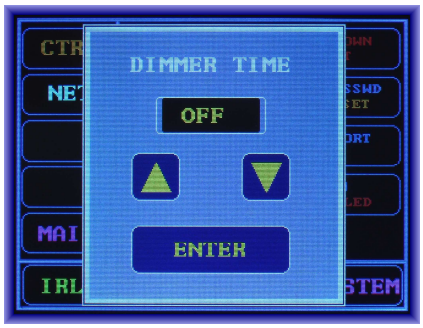
Touch to restart the IRLP system software. This will bring up a Verify Screen, touch OK to execute the restart or CANCEL to abort.

System Shutdown

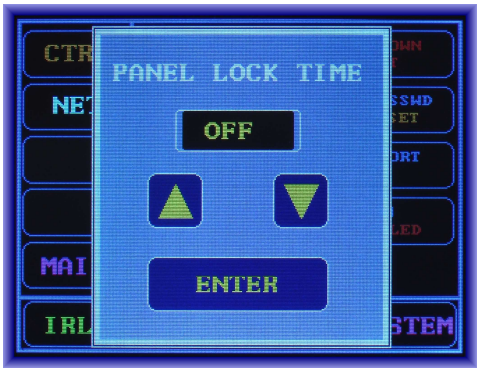
Touch to safely shutdown the system. This will bring up a Verify Screen, touch OK to execute the shutdown or CANCEL to abort.

Setting LCD display attributes

Touch to set LCD back light DIM timer, time intervals15s,30s,45s,60s, 1-10m, 10-60m. Touch the screen to bring display to full brightness.



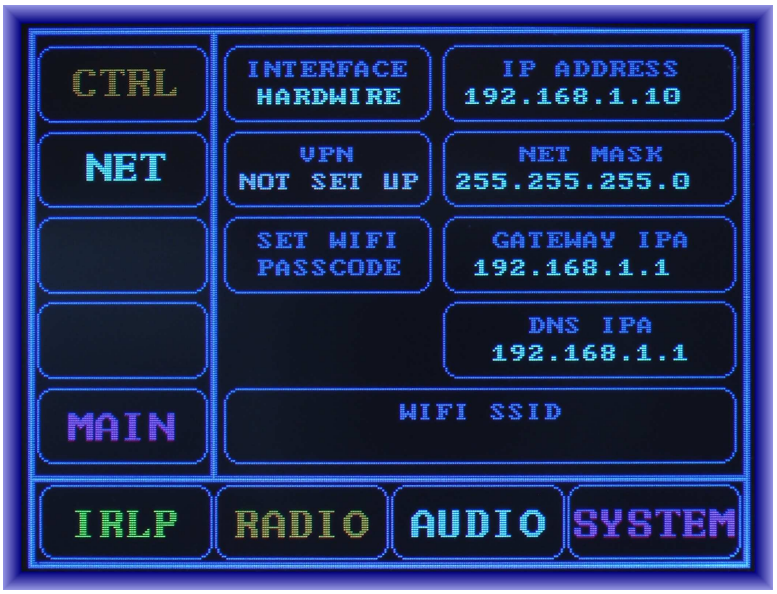
Touch to set Panel Lock timer, time intervals15s,30s,45s,60s, 1-10m, 10-60m. To unlock the LCD Touch Screen swipe from the bottom of the screen to the top.



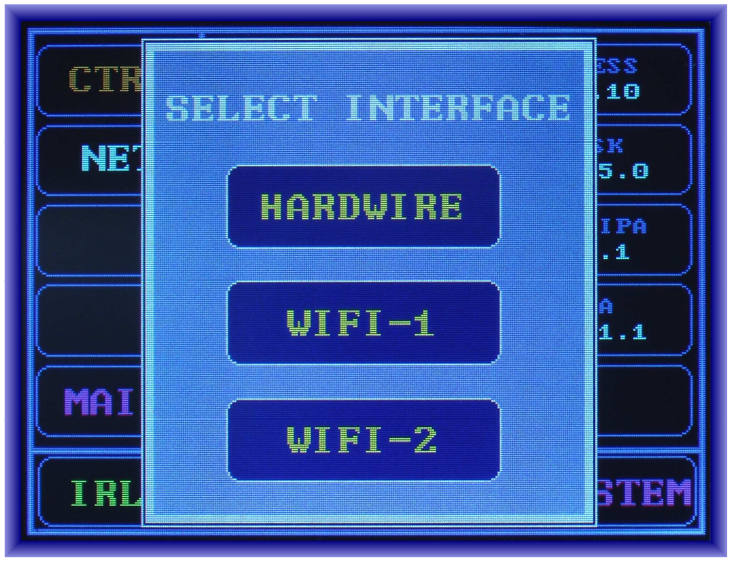
The Buttons to the left of the main window are used to configure Network Parameters and display a splash screen that contains the node's configured Node Numbers, Call Sign and Software Revision Level. A detailed description of these buttons and their functions plus other command control options follows.

18.0 SYSTEM NETWORK

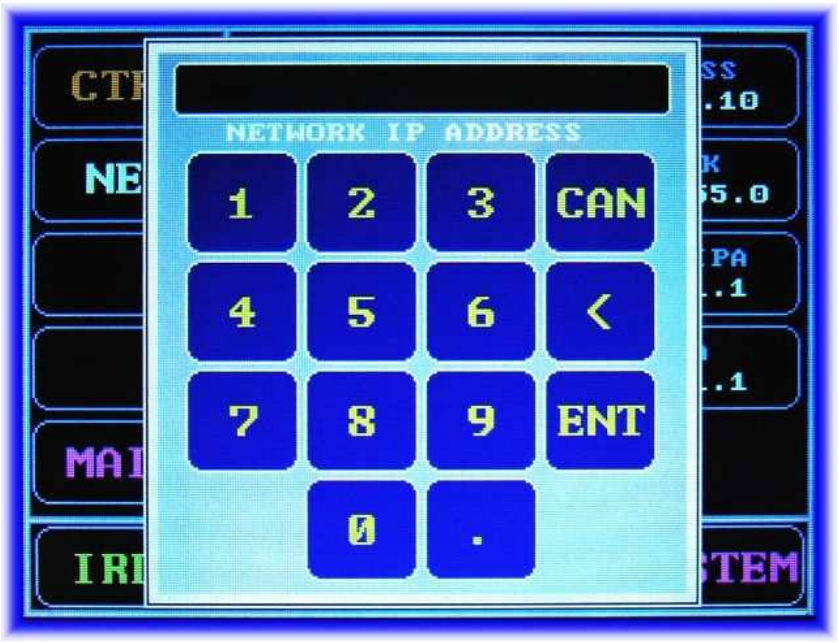
Touch to open the Network configuration screen. From here the individual network parameters and services can be setup.



Touch to open the SELECT INTERFACE dialog box, select the desired preset and setup all network parameters for this preset. Once the 3 preset are configured simply select which preset you want to use.



Touch to enter the NETWORK IP ADDRESS for the node then touch **ENT** to save the new value or **CAN** to abort.



Touch to enter the NETWORK MASK for the node then touch **ENT** to save the new value or **CAN** to abort.

GATEWAY IPA
192.168.1.1

Touch to enter the NETWORK GATEWAY IPA for the node then touch **ENT** to save the new value or **CAN** to abort.

DNS IPA
192.168.1.1

Touch to enter the NETWORK DNS IPA for the node then touch **ENT** to save the new value or **CAN** to abort.

Touch to ENABLE or DISABLE VPN functionality that has been previously configured in SECTION 11.0 (SETUP VPN CLIENT)

Touch if the network preset selected is WiFi 1 or WiFi 2 to set the WPA or WPA2 PASSCODE for the router or hotspot you are connecting to.

Touch if the network preset selected is WiFi 1 or WiFi 2 to set the SSID name for the router or hotspot you are connecting to.

19.0 FORWARDING IRLP PORTS THROUGH A ROUTER

As with any other IRLP node, if your Nano-Node is behind a router, you have to forward some TCP and UDP ports to the node, or put the node into the DMZ of the router.

The IP address of your node should have been set to a local static address in Section 18 "SYSTEM NETWORK" above. You will need to forward the following ports through your router to the IP address of the node:

15425 - 15427 TCP

2074 to 2093 UDP

If you want to be able to access the remote web administrator console from outside your local network, you will also need to forward:

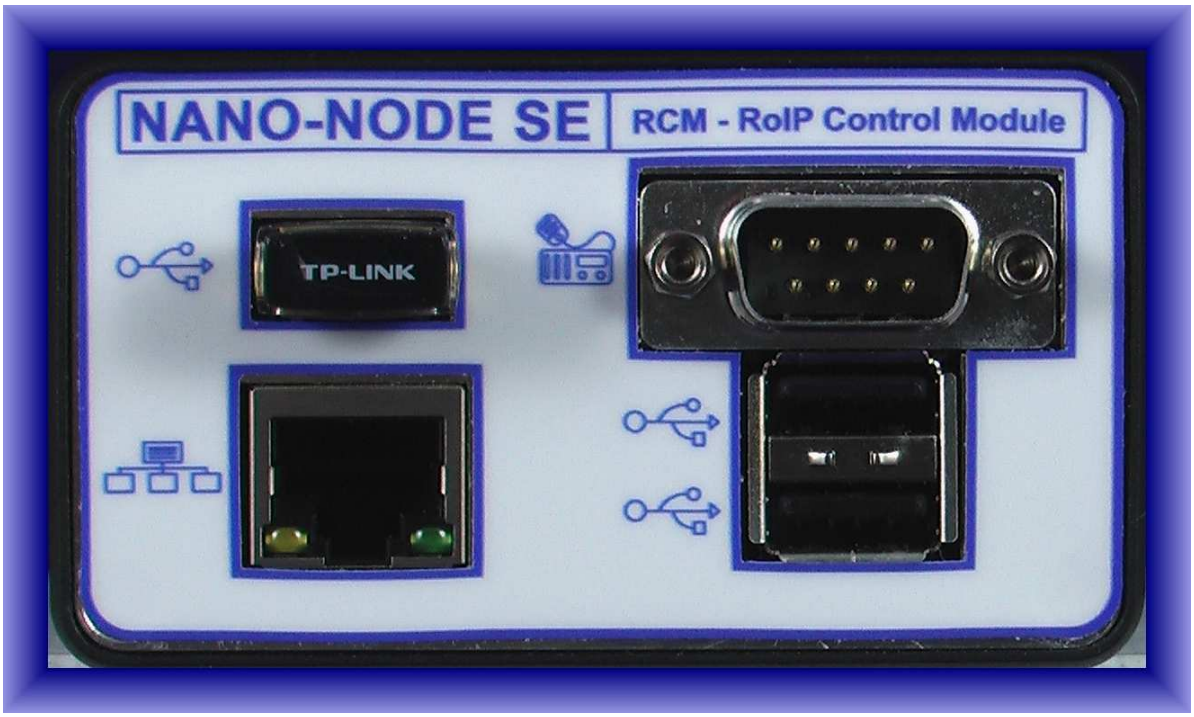
80 TCP

If you are using Echolink (EchoIRLP) on the embedded node, you will also need to forward:

5198 and 5199 UDP

Alternately, if your router has a "DMZ" feature, you can put the IP address of the Nano-Node into the DMZ, and all ports will be forwarded to the node.

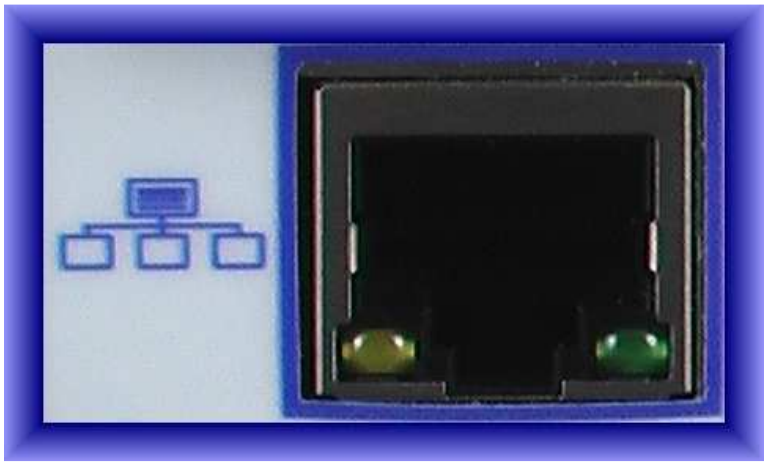
20.0 EXTERNAL CONNECTIONS



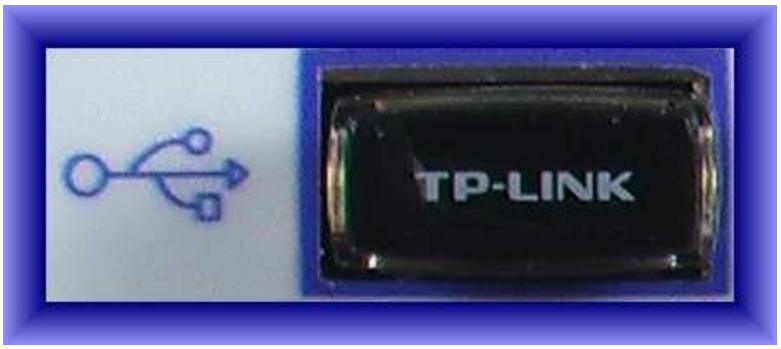
External Radio / Repeater Connection

Pin 1 - Transmit Audio to transmitter (AC Coupled)
Pin 2 - Transmit PTT Output (Active Low Open Collector 200ma max)
Pin 3 - ID PTT Output (Active Low Open Collector 200ma max)
Pin 4 - FAN Output (Active Low Open Collector 200ma max)
Pin 5 - AUX Output (Active Low Open Collector 200ma max)
Pin 6 - Power / Signal Ground
Pin 7 - CTCSS Input (Active HI or LO Programmable 14Vdc max)
Pin 8 - Receive Audio from receiver (AC Coupled)
Pin 9 - Auxiliary Power Input 7-18Vdc (400ma Min)

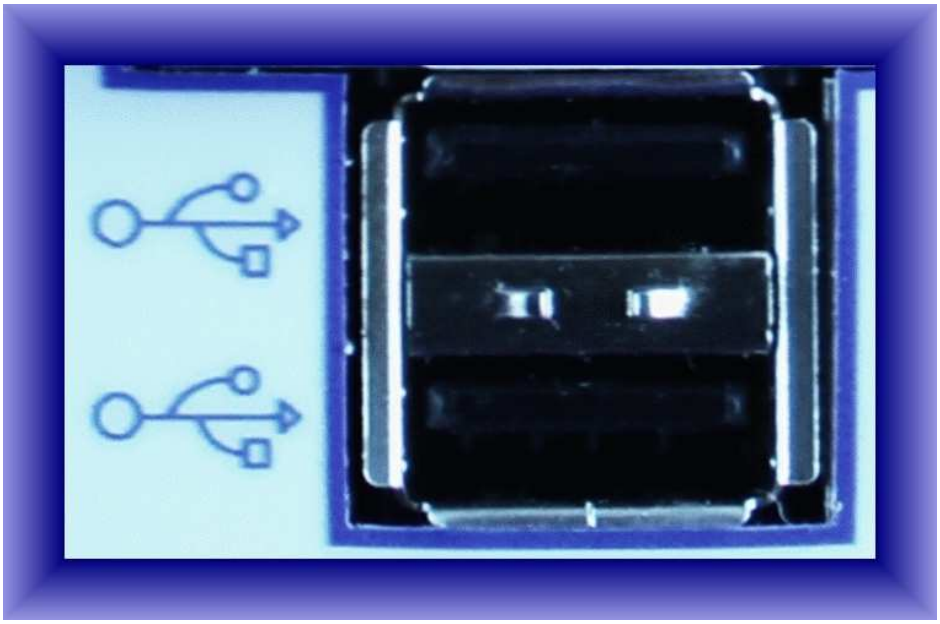
CAT-5 Network Ethernet Connection



USB Optional WiFi Radio Connection

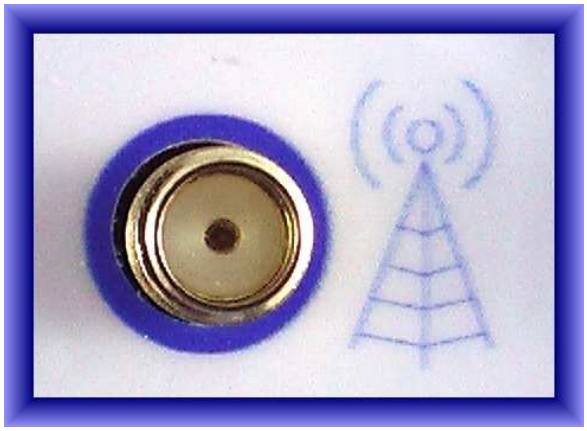


USB Expansion Port Connections (Optional GPS Receiver)



Main Power Connection 7-18VDC (400ma)

Internal Radio Antenna Connection



ECHO-IRLP *NANO-NODE SE*

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